

Article

Probiotics may be considered for children and adults with cystic fibrosis

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Commentary

Implications for practice and research

- Probiotics may be considered for children and adults with Cystic Fibrosis (CF) and might have some limited health benefits.
- Further research is required on the effects of varying duration, dose and type of probiotics on children and adults with CF.

Context

Cystic fibrosis (CF) is an autosomal recessive genetic disease caused by mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene (1) and affects an estimated 70,000 adults and children around the world (2). The CFTR impairment causes gut ecosystem imbalance (3). It has been suggested that probiotics can help with restoring gut microbiota in patients with CF (4). This review aimed to summarize the current evidence on the efficacy and safety of probiotics for improving health outcomes in children and adults with CF (5).

Methods

This protocol registered systematic review carried out a comprehensive literature search of multiple databases (from database inception to 20 January 2020). Only randomised controlled trials [RCTs] which compared the effectiveness of any oral probiotic formulation compared to any other probiotic formulation, placebo or no treatment control in adults and children with CF were included. Two reviewers carried out the screening process, data extraction and quality assessment (Cochrane collaboration criteria and GRADE) independently. An appropriate synthesis was carried out using a meta-analysis and a range of predefined and justified post-hoc subgroup analyses exploring age, dose, duration of washout and probiotic type for all primary and secondary outcomes where appropriate.

Findings

The evidence base for all outcomes were judged to be of low quality, in that the true effect might be substantially different from the effect reported within this review. The two main reasons for this uncertainty were selective reporting and the majority of studies only included children. The use of probiotics significantly reduced faecal calprotectin (intestinal inflammation marker) compared to placebo (-47.4 Bg/g, 95% CI:-93.28 to -1.54). There was a clinical and near statistically significant reduction in the number of pulmonary exacerbations comparing probiotics against a placebo after 12 months (0.32 episodes per participant lower, 95% CI:-0.68 to +0.03). There was no strong evidence that probiotics improve weight, lung function and hospitalisations compared to placebo. There was limited evidence and inconclusive findings on the moderating effects of age, dose, duration of washout and probiotic type on the effectiveness of probiotics in children and adults with CF. There were four adverse events reported in the probiotic group, two RCTs reported a single event each of vomiting, one RCT of single event of diarrhoea, and one RCT was terminated due to one severe adverse event of urticaria. There were no adverse events reported in the control group.

Commentary

Using the Amstar2 Tool it was judged that the review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest. However, these findings should be viewed with some caution due to the limited and low-quality evidence used for all outcomes, in particular when applying these findings to adults with CF as the majority of studies used children only.

Nevertheless, due to the low level of reported adverse events and the reduction in faecal calprotectin (intestinal inflammation marker) and possible clinically significant reduction in the number of pulmonary exacerbations, probiotics may be considered for children and adults with CF. Although it is important to ensure these factors of adverse events, possible cost implications and the low confidence in effectiveness of probiotics are taken into consideration on an individual basis.

There is still substantial uncertainty around the use of probiotics in children and adults with CF, particularly with regard to duration of use, dose and type of probiotic to be used. Furthermore, the effects on growth measures, hospital admissions, lung function and intestinal microbiota are still unclear. Multiple large multi-centred RCTs directly comparing these moderator variables and outcomes over at least a 12-month period are required. Where appropriate a subset analysis for age should be undertaken. Further research is required before any definitive recommendations can be made for children and adults with CF.

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Competing interests

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